

AN EPHEMERIS.

Connaissance des Temps. Extrait à l'usage des Écoles d'Hydrographie et des Marins du Commerce. Pour l'an 1891. (Paris: Gauthier-Villars et Fils, 1889.)

THE *Connaissance des Temps* has, within the last few years, by successive improvements, been made quite the most convenient Ephemeris for general use. The information it contains is conveniently given, and almost excessive in amount; and the result of course is that the pages of tabular matter are a good deal crowded, in order to make the annual volume of reasonable size. For travellers whether by sea or land it, like our own *Nautical Almanac*, is not, however, quite what is wanted. Much of the information it contains is of no use to them, and the size and weight of the book is excessive for their purposes. This appears to have come to the notice of the Ministry of Marine, who, in 1887, directed the publication of a pamphlet of extracts from the *Connaissance* containing the necessary information for Navigators and students for certificates as Masters, a copy of which is now before us.

In making this effort to meet the wants of a very large class of practical men the French have but followed the example of other countries. Some forty years ago the Prussian Government caused to be compiled a *Nautisches Jahrbuch*, which in its present form appears to be the best adapted of those we have seen for geographers and voyagers. It is manifestly copied, as to form, from the *Nautical Almanac*, avoiding all the matter useless to geographers, which is relegated to the well-known *Berliner Jahrbuch*; the contents are all given with an accuracy sufficient for the purposes for which it is intended: a thoroughly practical mind seems to have guided the whole arrangement, and the changes which seem desirable are but small. The American Government next published an *American Nautical Almanac*, which is practically a reprint of those parts of their larger Ephemeris which are supposed to be required at sea. It is needlessly accurate in its data, and needlessly bulky, but no doubt fulfils its object. And again, just before the French, the Austrian Government published at Trieste a Nautical Ephemeris founded on our *Nautical Almanac*, but almost identical in contents with that of the German Government before spoken of. This, it would seem, is published with the text and headings in more than one language.

The French work approaches most nearly in type to the American: it is mainly a reprint. That part which is not so is the Ephemeris of the Moon, and here convenience is sacrificed to a small gain of space. Not only are the pages crowded unduly, but the arguments (being at 12-hour intervals) are so far apart that interpolation becomes inconvenient.

Before closing we would like to point out that while all these Governments have provided an Ephemeris for their Nautical men and Travellers which is meant to be specially suited to their limited wants; England alone, which owns probably half the sea-going ships in the world, and furnishes no small proportion of the explorers, makes no special provision for them. It is not that there is no want felt: for there are several almanacs which, availing themselves of the *Nautical Almanac*, give astronomical data, together with various other matters

useful to seamen. Our *Nautical Almanac* took its present form on the report of a committee of the Royal Astronomical Society, to whom reference was made by the Admiralty in 1830. No great change has been made since then, and it is beginning to be thought time that its contents should be revised: if this is done, we trust it may be considered whether the wants of navigation and geography should not be specially taken into account. If we are right in believing that the Austrian Government have founded on our *Nautical Almanac* a publication which admits of all the tabular matter, which is so difficult and expensive to put in type, being combined with a text in varying languages, it might be possible by the adoption of a suitable form, to supply the wants of other nations as well as our own. Our *Nautical Almanac* in its present form is used, we believe, extensively by those maritime peoples who adopt Greenwich as a prime meridian, and it would, we think, not be difficult to arrange with their Governments for impressions suited to each language.

OUR BOOK SHELF.

The Wimshurst Electrical Influence Machine. By W. P. Mendham. (Bristol: King, Mendham, and Co., 1890.)

THIS little book, which partakes somewhat of the nature of a trade catalogue, briefly describes and illustrates the construction and action of the Wimshurst machines made by the firm of King, Mendham, and Co., and of the accessory pieces of apparatus needed for use with these machines in performing the antiquated experiments so much in vogue with the dabbler in frictional electrical science. The study of high tension electricity is coming to the front so much just now, that it is a great pity Mr. Mendham has not utilized his opportunity better, and given to the class of readers for whom this book is intended some notion of the many instructive and easily performed experiments on the disruptive discharge, and on electrical oscillations, which we owe to Hertz, Lodge, and others. The only concessions made to modern discoveries are in the descriptions of apparatus to show the action of the electric discharge on smoke, and of the Thomson quadrant electrometer. The latter, however, had better have been left alone, for the description is too meagre to enable the action of the instrument to be appreciated, and the reader may be apt to imagine that the quadrants are intended to be connected up directly to the terminals of a Wimshurst machine. We need scarcely say this would be very hard on the instrument. H. H. H.

Pawnee Hero-Stories and Folk-Tales. By George Bird Grinnell. (New York: Forest and Stream Publishing Company, 1889.)

THE Pawnees were at one time what Mr. Grinnell calls "a great people." They roamed over a vast territory, and enjoyed considerable material prosperity. Now, their numbers are greatly reduced, and the few who remain give a very inadequate idea of the vigour of the original stock. The author of the present book knew the tribe intimately twenty years ago. He used to camp and hunt with them in Nebraska, and at night they told him hero-stories and folk-tales which had been handed on to them from their forefathers. Many of these narratives he carefully translated and wrote down at the time; and quite lately he visited his old friends for the express purpose of inducing them to extend his collection. They were eager to meet his wishes, and so he was able to bring together the stories which he has now published. He claims that they are recorded exactly as he himself

heard them, and that they may therefore be regarded as faithfully reflecting the Pawnee character. As genuine documents, throwing light on the ideas and habits of a primitive people, the stories are of some scientific value; and students of anthropology will find in them a good deal that is interesting and suggestive. Mr. Grinnell adds various notes, in which he gives much well-arranged information as to the history, racial affinities, and institutions of the Pawnees.

LETTERS TO THE EDITOR.

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The Influences at Work in producing the Cerebral Convolutions.

DR. G. JELGERSMA, of Meerenberg, has recently published two remarkable papers,¹ in which he endeavours to explain the influence which leads to the production of the convolutions on the surface of the cerebrum and cerebellum. Many theories have been advanced to account for these. Several authorities have ascribed their presence to mechanical forces operating upon the brain from without, whilst others have sought to explain them by the supposition of different degrees of growth-tension acting upon the brain-surface; but in every case these theories, when submitted to the test, have broken down, in so far that it is impossible, by means of any of them, to show how it comes about that small animals have smooth brains, and large animals convoluted brains; how, in short, we should find in the beaver—an animal remarkable for its intelligence—a cerebrum almost entirely smooth, and in the sheep—an animal, shall we say remarkable for its dullness?—a brain with a high convolutionary system. Jelgersma not only explains this, but makes the apparent discrepancy the strongest pedestal of support to his theory. Briefly put, his views are as follows:—

The grey cortex of the cerebrum, which in different forms of the same animal group preserves a tolerably constant thickness, increases by surface extension. Now, if we extend the surface of a smooth-brained animal say four times, we must provide eight times as much white matter to fill the interior of the grey capsule, if we desire to keep the surface even; or, to put it in different terms, if we lengthen out the radius of the brain say ten times, we acquire a surface extension one hundred times greater, and an internal capacity one thousand times greater. The geometrical law involved is simply this, that in the growth of a body the surface increases with the *second*, but the interior with the *third* power of the radius.²

Such being the case, it is very evident, seeing that the proportion of internal white matter and external grey matter is in all cases a uniform one, that in the evolution of a large animal out of a small animal, a disproportion between the grey capsule and the white core of the cerebrum must result. This is compensated for by the extended cortex placing itself in folds or puckers, and thereby reducing the capacity of the capsule to a degree which brings it into correspondence with the white contents. Consequently, "the formation of the convolutions and furrows is simply the result of the tendency on the part of the superficial layer to increase by surface extension and of a mutual space-accommodation (*Raumaccommodation*) of the grey substance and of the white conducting paths."

I have not written this short account of Jelgersma's views—important though they be—simply for the purpose of giving them a wider circulation through the pages of NATURE, but with the object of stating that the theory advanced has received independent testimony in its favour at the hands of my colleague, Prof. George F. Fitzgerald. For two years or more I have been engaged in a research bearing upon the growth of the cerebral hemispheres, and have constantly had occasion to ap-

preciate the unsatisfactory nature of the current theories as to the formation of the convolutions of the brain. Consequently, in February last, before I had read Jelgersma's first article, and before the appearance of the second, I explained to Prof. Fitzgerald, as far as I could, the conditions of cerebral development, and asked him if he could offer any geometrical explanation which would account for the appearance of the convolutions. The views which he then advanced were identical with those of Jelgersma, and further, they were expressed in very similar terms. I feel that this adds greatly to the weight of the hypothesis.

But Prof. Fitzgerald went further than Jelgersma, because the latter states that he is unable to explain why the fissures and convolutions should, within certain limits, assume the same formation in different animals. Fitzgerald, however, saw the importance of his theory in regard to the localization of function in different areas of the cerebral cortex. The surface extension of the cerebrum cannot be a uniform one: the bulgings out in the shape of the convolutions must necessarily be connected with the functions which the areas involved have to perform. Therefore if a given area of grey matter increases it must pucker out, unless an undue quantity of white matter grows all over the inside of the grey cortex.

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May 24.

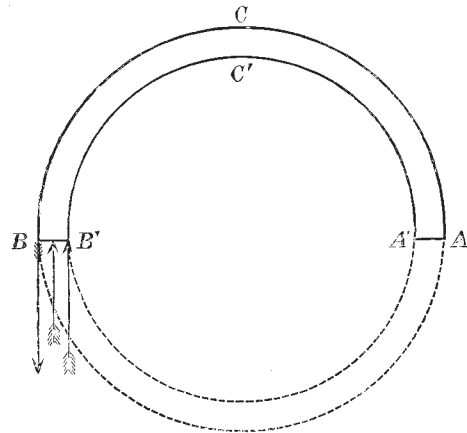
The Bourdon Gauge.

FROM Prof. Greenhill's letter on this subject in NATURE, vol. xli. p. 517, as well as from that of a writer in *Engineering*, I gather that I did not succeed by my letter (NATURE, vol. xli. p. 296) in making quite clear the point of my explanation of the action, since Prof. Greenhill argues that consideration of the longitudinal stresses in the walls leads to the conclusion that the tube would curl up under internal pressure rather than uncurl.

Towards the top of the second column on p. 296 in my letter I used the words "Consider now the equilibrium of any portion . . . when the internal pressure is applied and before uncurling takes place." Perhaps it would have been clearer to have written "*after the internal pressure has been applied*," &c. In the last figure on the same page the tension *T* is that exerted by the outer wall of the *already distended gauge* as it contracts, while *P* is the thrust of the inner wall, each on the part *AC* supposed solidified.

I desire specially to emphasize the words italicized, for my method of explanation amounts to an artifice for taking the distension into account. It is because Prof. Greenhill has overlooked this that he arrives at an opposite conclusion, and wishes apparently to reverse the forces in the figure referred to.

I hope to make this clear by putting the argument again in a slightly different form.



Starting, as before, with a tube of rectangular section, with the end *AA'* fixed and *BB'* free, we arrive at the uncured condition by taking the tube in imagination through the following series of steps:—

(1) Remove the ends *AA'* and *BB'*, and complete the annulus as indicated by the dotted lines of the figure.

¹ "Über den Bau des Säugethiergehirns," *Morphologisches Jahrbuch*, June 1889; "Das Gehirn ohne Balken; ein Beitrag zur Windungstheorie," *Neurologisches Centralblatt*, March 1890.

² It is right to state, although, indeed, Jelgersma does not mention it, that many years ago Baillarger ascribed the increase of the convolutions with the increase in the size of the animal to the same geometrical law.